

2009 Annual Survey of Government Employment Methodology

The U.S. Census Bureau sponsors and conducts this annual survey of state and local governments as authorized by Title 13, United States Code, Section 182.

The survey measures the number of federal, state, and local civilian government employees and their gross payrolls for the pay period including March 12, 2009.

Population of Interest

The population of interest for this survey includes the civilian employees of all the Federal Government agencies (except the Central Intelligence Agency, the National Security Agency, and the Defense Intelligence Agency), all agencies of the 50 state governments, and 89,476 local governments (i.e., counties, municipalities, townships, special districts, and school districts) including the District of Columbia.

Content of the Survey

The survey provides data on full-time and part-time employment, part-time hours worked, full-time equivalent employment, and payroll statistics by governmental function (i.e., elementary and secondary education, higher education, police protection, fire protection, financial administration, central staff services, judicial and legal, highways, public welfare, solid waste management, sewerage, parks and recreation, health, hospitals, water supply, electric power, gas supply, transit, natural resources, correction, libraries, air transportation, water transport and terminals, other education, state liquor stores, social insurance administration, and housing and community development).

The payroll data for the Federal Government are total monthly payroll only.

There is no detail available for full-time or part-time employee payrolls. Three functions apply only to the Federal Government and have no counterpart at the state and local government levels: national defense and international relations, postal service, and space research and technology.

The questionnaires that were used to collect these data can be viewed at <[GET FORMS](#)> on the Government Employment and Payroll Website.

Critical definitions include the following:

Employment: Employment refers to all persons gainfully employed by and performing services for a government.

Employees: State and local government employees include all persons paid for personal services performed, including persons paid from federally funded programs, paid elected or appointed officials, persons in a paid leave status, and persons paid on a per meeting, annual, semiannual, or quarterly basis. Unpaid officials, pensioners, persons whose work is performed on a fee basis, and contractors and their employees are excluded from the count of employees. For

federal employees, employee counts are the on-board "head count" as of the end of the report period. The data collected for this survey include all federal civilian employees, including seasonal and intermittent employees, and employees on foreign assignments residing outside the 50 states and the District of Columbia. Employees of the Central Intelligence Agency, the National Security Agency, and the Defense Intelligence Agency are not included in any of the data presented by government function. Federal judges, members of Congress and their staffs, employees of the Congressional Budget Office, and elected (with the exception of the President) and appointed officials of the Executive Branch are included. Employees of non-appropriated funds of defense activities are not classified as federal employees; therefore, they are excluded.

Full-time employees: Full-time employees are defined to include those persons whose hours of work represent full-time employment in their employing government.

Part-time employees: Part-time employees are those persons who work less than the standard number of hours for full-time work in their employing government.

Full-time equivalent: Full-time equivalent (FTE) is a computed statistic representing the number of full-time employees that could have been employed if the reported number of hours worked by part-time employees had been worked by full-time employees. This statistic is calculated separately for each function of a government by dividing the "part-time hours paid" by the standard number of hours for full-time employees in the particular government and then adding the resulting quotient to the number of full-time employees.

Payroll: Payroll amounts represent gross payrolls for the 1-month period of March (31 days). The gross payroll includes all salaries, wages, fees, commissions, bonuses, or awards paid to employees during the pay period that includes the date of March 12. Payroll amounts reported for a period other than 1-month are converted to represent an amount for the month of March. All payroll figures are represented in current whole dollars and have not been adjusted for inflation.

Conversion of a reported payroll to a payroll amount that would have been paid during a 31-day month is accomplished by multiplying the reported payroll by an appropriate factor. For example, a 2-week payroll is multiplied by 2.214, a 1-week payroll is multiplied by 4.429, and a twice-a-month payroll is multiplied by 2.000.

Part-time hours: These data represent the number of hours worked by part-time employees during the pay period. Note: These data are not collected for publication but rather are used to calculate full-time equivalent employment data.

Data Collection

Confidentiality

The data that are collected in this survey are public record and are not confidential¹.

Dates of Collection

The following are important dates in the data collection process:

03/2009	Initial mail-out
04/2009	Reminder letter mail-out
06/2009	Follow-up mail-out
08/2010	Preliminary release to Census Bureau Internet
01/2011	Revised data to Census Bureau Internet

Methods

Data in these files are based on information obtained in the Annual Survey of Government Employment. Census Bureau staff compiled Federal Government data from records of the U.S. Office of Personnel Management. Forty-five of the state governments provided data from central payroll records for all or most of their agencies/institutions. Data for agencies and institutions for the remaining state governments were obtained by mail canvass questionnaires. Local governments were also canvassed using a mail questionnaire. However, elementary and secondary school system data in Florida, North Dakota, and Washington were supplied by special arrangements with the state education agency in each of these states. Additionally, in Delaware, a state respondent supplied data for school districts. All respondents receiving the mail questionnaire had the option of completing the survey using a web-based survey instrument developed for reporting the data. Respondents completed 18.1% of state-level units and 47.1% of local government units using the online survey instrument.

Sample Design

The 2009 Sample for the Annual Survey of Public Employment and Payroll was developed from the 2007 Census of Governments: Employment Component (CoG-E) and updated with births to the universe since 2007. A two-stage sample was designed to produce state-by-type of government estimates with a relative standard error of three percent or less on FTE employees and total payroll. In the first stage, the sample design is a stratified probability proportional to size (PPS) design. In the second stage, we developed a modified cut-off sample method to reduce the number of small townships and special districts. There are a total of 90,690 units on the frame.

Units satisfying the following criteria were automatically included in the sample with a probability of 1.0000. These certainty units represent themselves only.

- All county governments with a 2007 population of 100,000 or more.
- All municipalities with a 2007 population of 75,000 or more.
- All townships with a 2007 population of 50,000 or more.

¹ Title 13, United States Code, Section 9.

- All independent school districts with an enrollment of 10,000 or more.
- All school districts providing college level (postsecondary) education.
- All special districts that meet at least one of the following criteria:
 - FTE of 1,000 or more,
 - All water utilities (function code 91) in the state of Connecticut,
 - All electric utilities (function code 92) in the states of Maine, New Hampshire, Rhode Island, Utah, and Wisconsin,
 - All gas utilities (function code 93).

All other units were given a chance of selection based on the total payroll of the unit. Prior to selecting the sample, the sampling frame was sorted by state and type of government (city, county, township, special district, school district). For special districts, the sampling frame was sorted by probability of selection within function code. (Note: See Chapter 12 of the [2006 Classification Manual](#) for the categories for classifying Employment data.)

Prior to mail-out, the sample universe file was updated with births (units that did not exist during prior years of the survey). All city, county, township, and school district births are added to the sample with a probability of selection of 1.0000. Special districts were included with certainty if they met the certainty criteria as mentioned above. The remaining special districts were sorted by function code and state, and then sampled systematically at a rate of 1 in 25.

Weighting

The weight for each unit in the sample is the reciprocal of that unit's probability of being selected into the sample. For example, for units that were included in the sample with a probability of 0.0200, the weight is $(1 / 0.0200) = 50$. For units that were included in the sample with a probability of 1.0000, the weight is 1.0000.

Sample size

A final sample of 10,312 units was selected. Of the total number of governments in the sample, approximately 0.5 percent are states, 14.1 percent are counties, 35.2 percent are cities and townships, 29.9 percent are special districts, and 20.3 percent are school districts. All 50 state governments, all Hawaii local units, and the District of Columbia are certainty units with a weight of 1.0000.

Data Processing

Editing

Editing is a process that tries to ensure the accuracy, completeness, and consistency of survey data. Efforts are made at all phases of collection, processing, and tabulation to minimize reporting, keying, and processing errors.

Although some edits are built into the Internet data collection instrument and the data entry programs, the majority of the edits are performed post collection. Edits consist primarily of two types: (1) *consistency edit* and (2) an *historical ratio edit* of the current year's reported value to the prior year's value.

The *consistency edits* check the logical relationships of data items reported on the form. For example, if a value exists for employees for a function then a value must exist for payroll also. If part-time employees and payroll are reported then part-time hours must be reported and vice versa.

For each function reported for the employees, the *historical ratio edits* compare data for the number of employees and the average salary between reporting years. If data fall outside of acceptable tolerance levels, the item is flagged for review. Additional checks are made comparing data from the Annual Finance Survey to data reported on the Survey of Government Employment to verify that if employees are reported on the Survey of Government Employment at a particular function the government also reported a corresponding expenditure on the Annual Finance Survey.

For *historical ratio edits* and *consistency edits*, the edit results are reviewed by analysts and adjusted as needed. When the analyst is unable to resolve or accept the edit failure, contact is made with the respondent to verify or correct the reported data.

Imputation

Not all respondents answer every item on the questionnaire. There are also questionnaires that are not returned despite efforts to gain a response. Imputation is the process of filling in missing or invalid data with reasonable values in order to have a complete data set for estimating state and national totals.

For nonresponding general purpose governments, dependent and independent school districts, and for special district governments, the imputations were based on recent historical data from either a prior year annual survey or the 2007 Census of Government Employment, if available. These data were adjusted by a growth rate that was determined by the growth of responding units that were similar (in size, geography, and type of government) to the nonrespondent. If there were no recent historical data available, the imputations were based on the data from a randomly selected responding donor that was similar (based on the same criteria) to the nonrespondent. For general purpose governments, and for dependent and independent school districts, the selected donor's data were adjusted by dividing each data item by the population (or enrollment) of the donor and multiplying the result by the nonrespondent's population (or enrollment).

Estimation

Estimation is the process by which sample data are used to project the value of an unknown quantity in a population. In the publications for employment statistics, total full-time employment, total full-time payroll, total full-time equivalent, total part-time employment, total part-time payroll, total part-time hours, and their coefficients of variations are published. A composite estimate for each state by function code variable can be obtained from the sample data and

known 2007 census.

Generally, the value of each variable from the 2007 Census of Government: Employment Component (CoG-E) was used in a linear model to adjust the current year sample estimate by a factor, which accounts for how much the sample under- or over-estimated the census total. This factor may reduce the variability of the estimate. However, there were some exceptions. The simple unbiased estimate was used for some of the variables in small state by function code cell with fewer than 5 sample units. For Hawaii and Washington, D.C., all units in these states are in sample so a simply aggregation of the data was used.

Sampling Variability

The data that are provided come from a sample rather than a census of all possible units. The particular sample that was selected is one of a large number of possible samples of the same size and sample design that could have been selected. Each sample would have yielded different estimates. The estimated coefficients of variation, which are provided for each estimate, are an estimate of this sampling variability. In this tabulation the coefficients of variation are expressed as percentages. The coefficient of variation is the standard error as a proportion of the magnitude of the estimate. In the tables, the coefficient of variation expresses the standard error as a percentage of the quantity being estimated.

The sample estimates and coefficients of variation provided in the files can be used to construct interval estimates with a specified probability that the interval includes the average of the estimates of the parameter derived from all possible samples of the same size and design. For example, if all possible samples were surveyed under essentially the same conditions and estimates calculated from each sample, then:

1. Approximately 68 percent of the intervals from one standard error (the product of the coefficient of variation and the point estimate) below the estimate to one standard error above the estimate would include the average value of all possible samples.
2. Approximately 90 percent of the intervals from 1.65 standard errors below the estimate to 1.65 standard errors above the estimate would include the average value of all possible samples.

Thus, for a particular sample, one can say with specified confidence that the average of all possible samples is included in the constructed interval.

Example of a confidence interval. The estimate of total full-time equivalent state and local government employment for Alabama in 2009 is 286,050 and the estimated coefficient of variation is 1.10 percent. The standard error is then 1.10 percent of 286,050 or 3,147.

An approximate 90-percent confidence interval can be constructed by first multiplying the standard error by 1.65 and then adding and subtracting that result from the estimate to obtain the upper and lower bounds.

- ❑ Calculate the half-width of the confidence interval: $1.65 \times 3,147 = 5,193$.
- ❑ Construct the confidence interval by adding the estimated half-width to $(286,050 + 5,193)$ and subtracting the same value $(286,050 - 5,193)$ from the estimate of total to get the confidence interval which ranges from 291,243 to 280,857.

State government employment and payroll data are not subject to sampling error. Consequently, state and local government aggregates for individual states are more reliable statistically than the local government only estimates.

Data Quality

Nonsampling Errors

Although every effort (as described in the Data Processing section) is made in all phases of collection, processing, and tabulation to minimize errors, the sample data are subject to nonsampling errors (such as, inability to obtain data for every variable from all units in the sample, inaccuracies in classification, response errors, misinterpretation of questions, mistakes in keying and coding, and coverage errors). These same errors may be evident in census collections and may affect the Census of Governments data used to adjust the sample during the estimation phase and used in the imputation process.

Modal Distribution

Each respondent that received a mail questionnaire had the option of returning the paper questionnaire, reporting data using a website developed for reporting data electronically, or working directly with staff members to report over the phone, fax or email. In addition, some governments have developed alternative reporting arrangements, known as central collection. The following table shows the response rate by mode for state and local governments that reported to the Annual Survey of Government Employment.

	State Governments	Local Governments
Web	18.1%	47.1%
Paper	18.3%	44.4%
Central Collection	58.1%	1.1%
Other	5.5%	7.4%

Overall Unit Response Rate

The overall unit response rate to the 2009 Annual Survey of Government Employment was 88.5 percent. All of the 50 state governments responded to the survey. In determining the unit response rate, a unit was determined to be a

respondent if it provided information on all of the key variables for at least one function on the survey form. This unit response rate was calculated for each state as well as for the total U.S., and gives the percentage of the units in the eligible universe that actually responded to the survey.

For 2009, weighted item response rates are published for each item. This rate is calculated by dividing the weighted value of the item as reported by respondents by the weighted value of the item reported for respondents and imputations for nonrespondents.

Total Quantity Response Rate

The Total Quantity Response Rate was also calculated for the key variables for each state. This response rate is computed separately for each key variable by summing the data provided by the respondents for the key variable and dividing this sum by the sum of the respondent data and the imputed data for the key variable. The result is multiplied by 100. Total Quantity Response Rates for total employment and total payroll are available in the response rate files.

The Census Bureau's quality standard on releasing data products requires a 70 percent Total Quantity Response Rate (TQRR) for key items. Although the unit response rates are well above the 60 percent Census Bureau's quality standard, Maryland, Massachusetts, Nebraska, New Mexico, Oklahoma, and Rhode Island state and local estimates fail to meet the 70 percent TQRR standard for at least one key item. Most of the states are noncompliant on Part-time (PT) Payroll and/or PT Employment, but New Mexico is noncompliant on all key state and local variables. There are nine states (Arizona, Colorado, Connecticut, Louisiana, Massachusetts, New Hampshire, New Jersey, New Mexico, and Rhode Island) that are noncompliant for at least one TQRR key item for the local estimates. Additionally, there are eight states (Maryland, Missouri, Nebraska, New Mexico, Ohio, Oklahoma, Rhode Island, and Vermont) that are noncompliant for at least one TQRR key item for the state estimates. Files of the unit response rates and TQRRs for all states are available in the Response Rate Tables section.

Response Rate Tables

[State & Local Response Rates](#) [TXT, 5KB] – Unit and Total Quantity response rates by state for state and local governments combined

[Local Response Rates](#) [TXT, 5KB] – Unit and Total Quantity response rates by state for local governments